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**STATE
OF
CALIFORNIA**

Edmund G. Brown - Governor

**DEPARTMENT
OF
NATURAL RESOURCES**

DeWitt Nelson - Director

FOREST FIRE REPORT
1960
DIVISION OF FORESTRY

F. H. Raymond - State Forester

Fire Control
Fire Prevention
Research
Development
Improvements

Cooperation
Personnel
Finances
Planning
Communications

I

CALIFORNIA DIVISION OF FORESTRY

1960 FOREST FIRE SEASON

1. CHARACTER AND EXTENT OF THE FIRE SEASON

Due to a combination of "moderately bad" fire weather and abnormal dryness of fuel types the 1960 fire season was one of the more dangerous in the Division's history.

Although the weather was drought-like, the extremely hazardous fuel conditions that faced California's fire fighters was caused by a cumulative effect of several years of adverse dryness, rather than the single year 1960. This abnormal dryness of ground surface and fuel types was quite apparent before the declared fire season began. Conditions during May and June were what Californians usually experience in July and August. Fuels could easily be compared to a "powder keg"; all that was needed to set it off was a spark.

To ascertain the extent of season severity we can examine three basic factors: weather, incidence of fires, and acreage burned. As a measurement of weather and the cumulative effect of the drought upon the year 1960, we provide the California Burning Index figures for the years 1958, 1959, and 1960. The following table of statewide averages for the period June through September clearly shows a progressive shift to more days of "very high" and "extreme" during 1960 than in the previous two years.

BURNING INDEX - FIRE RISK & HAZARD

<u>Year</u>	<u>Days Low</u>	<u>Days Moderate</u>	<u>Days High</u>	<u>Days Very High</u>	<u>Days Extreme</u>	<u>Total Days</u>
1958	13	49	43	13	4	122
1959	7	37	47	19	12	122
1960	5	36	45	23	13	122

Further evidence of bone dry conditions is the near record-breaking number of forest fires experienced during the year. This season's figures

are the third highest on record for both "total fires" and "man-caused fires" and the second highest for "lightning caused." There is no doubt this year's fire occurrence would have equaled or possibly exceeded the record breaking years of 1958 and 1959 if the 1960 fire season had been as extensive as these years.

There were 2,868 fires this year; 2,450 man-caused and the balance of 418 were caused by lightning. This compares with the ten-year average of 2,076 man-caused, 196 lightning and a total of 2,272. Using the decade average as a base, total fires increased by 26%; man-caused by 18% and lightning fires by 113%.

Although the 1960 season possessed the ingredients that generally produce large acreage losses, the 123,743 acres blackened by fire this year is some 24,400 or 17% less than the ten-year average. No doubt, the main factor contributing to the relatively low acreage loss was the minimum number of major type fires (300 acres or more) experienced this year. There were 37 of this type fire compared to the ten-year average of 76. Statistics have proved this type of fire is usually responsible for approximately 90% of the total acreage burned each season. Consequently, the fewer major type fires experienced during the season, the less acreage loss. As an example, although truly unusual, the Division had one fire (the 50,500 acre Weferling fire) which accounted for two-fifths of the total acreage burned during the year. It is interesting to note that had it not been for this fire, the acreage losses this year would be one of the smallest in the Division's history.

The following tables compare the occurrence and acreage burned during 1960 with the 1950-59 average for each of the six administrative districts:

State Direct Protection Area
Zones I and II

<u>District</u>	<u>1960</u>	<u>Occurrence</u>		<u>1960</u>	<u>Acreage Burned</u>	
		<u>1950-59</u>	<u>% of Increase</u>		<u>1950-59</u>	<u>% of Increase</u>
		<u>Average</u>	<u>or Decrease</u>		<u>Average</u>	<u>or Decrease</u>
North Coast	613	583	+ 5.1	23,192	46,967	- 50.6
Sierra-Cascade	726	444	+ 63.5	6,039	22,524	- 73.2
Central Sierra	571	503	+ 13.5	27,763	14,649	+ 89.5
San Joaquin	181	153	+ 18.3	3,817	13,266	- 71.2
Central Coast	338	228	+ 48.2	55,721	23,943	+ 132.7
Southern California	439	361	+ 21.6	7,211	26,869	- 73.2
Statewide	2868	2272	+ 26.2	123,743	148,218	- 16.5

Annual Forest Fire Statistics
Zone I & II Area Directly Protected
By The
California Division of Forestry

<u>Year</u>	<u>Total</u>	<u>Man-Caused</u>	<u>Total</u>	<u>Class E Fires</u>
	<u>No. Fires</u>	<u>Fires</u>	<u>Acreage Burned</u>	<u>(300 Acres or Larger)</u>
1948	1,973	1,898	133,223	51
1949	2,608	2,385	132,253	80
1950	2,277	2,118	303,393	105
1951	2,159	1,858	148,360	79
1952	2,263	2,058	120,974	87
1953	2,080	1,932	125,150	58
1954	2,017	1,955	140,072	73
1955	1,941	1,801	161,488	61
1956	1,758	1,566	64,617	39
1957	1,986	1,895	124,316	70
1958	3,087	2,613	146,159	97
1959	3,167	2,982	147,658	95
1960	2,868	2,450	123,743	37

All Clarke McNary Lands Within California

<u>Year</u>	<u>Total</u>	<u>Man-Caused</u>	<u>Total</u>	<u>Class E. Fires</u>
	<u>No. Fires</u>	<u>Fires</u>	<u>Acreage Burned</u>	<u>(300 Acres or Larger)</u>
1948	2,134	2,023	124,206	
1949	2,726	2,313	117,020	
1950	2,556	2,078	263,136	
1951	2,439	1,880	137,851	
1952	2,422	1,936	83,967	
1953	2,214	1,850	152,670	67
1954	1,993	1,866	104,488	62
1955	2,070	1,701	209,141	60
1956	2,127	1,607	87,868	47
1957	2,038	1,895	110,182	74
1958	3,109	2,359	163,918	82
1959	2,473	2,339	127,473	84
1960	2,373	1,820	106,933	29

Summary

In consideration of the facts, i.e., abnormal dryness, moderately bad fire weather, and a very high incidence of fires, the 1960 fire season can be classified as one of the more hazardous in the Division's history, yet, insofar as acreage burned is concerned, a relatively successful season.

On all Clarke-McNary lands throughout the State there were 29 fires in the 300 acre or larger class. These fires burned the following acres by vegetation type:

Forested Lands	24,425 acres
Non-Forest	<u>82,508</u> acres
Total	106,933 acres

2. PROGRESS MADE IN EXTENDING PROTECTION TO NEW AREAS
AND ESTABLISHMENT OF BETTER PROTECTION IN OLD AREAS

A. New Areas:

No new area of Zone I was taken over for protection by the State during 1960.

B. Old Areas:

Five initial attack bulldozer-transport units were added during the 1960-61 fiscal year. One unit was assigned to each of the following Ranger Units: Humboldt, Mendocino, Napa, Sonoma and Santa Cruz.

The 1960-61 fiscal year fire control organization is as follows:

230 Initial attack crews*	54 - #1
	38 - #2
	111 - #3
	19 - #4
	8 - #5
35 Patrolmen	
82 Lookouts (3 are manned by a Lookout-Patrolman on high hazard days)	
55 Initial Attack Bulldozer-Transport Units	
(27 Large, D-7 or equal)	One large unit was replaced
(28 Medium, D-4 or equal)	with a medium unit during the year.

*With the adoption of the 1956 Fire Plan, the designation of crews changed from 4, 9 and 13 man crews to #1, #2, #3, #4, or #5 crew. The #3, #4,

and #5 crews have 2 fire trucks.

- (a) #1 Crew: 1.5 foremen; 1 driver; 3 firefighters
- (b) #2 Crew: 1.5 foremen; 1 driver; 6 firefighters; 1 cook
- (c) #3 Crew: 1.5 foremen; 2 drivers (1 yearlong; 1 seasonal);
6 firefighters; 1 cook
- (d) #4 Crew: 1.5 foremen; 2 drivers (1 yearlong; 1 seasonal);
8 firefighters; 1 cook
- (e) #5 Crew: 1.5 foremen; 2 drivers (1 yearlong; 1 seasonal);
10 firefighters; 1 cook

C. Air Program

For the first time a portion of the Division's annual support budget was allotted specifically for all uses of aircraft in 1960. In the past, the use of aircraft on forest fires has been paid principally from emergency funds. Other support budget allotments have been made from time to time for specific purposes such as the experimental initial attack use of air tankers in 1958 and 1959. In 1960 some \$280,000 was provided for use of observation and supplemental detection aircraft, air tankers, helicopters, and transportation of personnel. Some emergency funds were also used for these purposes on large campaign fires. For the most part the Districts acted within their budgets and contracted for the use of all types of aircraft, including air tankers and the purchase of fire retardants.

Although the air tanker program was completely operational in 1960, its evaluation was continued. Data from the air tanker experiments in 1958 and 1959 showed that there was still much to be learned in the efficient and economic dispatching and using of this new fire tool. Consequently, field personnel continued to fill out evaluation report forms specifically designed for the purpose. cursory study of the data to date shows considerable improvement in the effective use of air tankers by the Division's fire control personnel in 1960.

In 1960 the Division's first helitack crew was formally organized by District 1 (North Coast), using part of their regular support funds, and established at Pratt Mountain Lookout in southern Humboldt County near Garberville. A foreman and three fire fighters were on stand-by with an Allouette helicopter throughout August and September. The turbo-jet Allouette was capable of carrying the pilot and the four man crew complete with all their gear. The crew participated in 20 fire situations: 1 false alarm, 3 campaign fires where the action was transportation of personnel and observation only, 5 fires where the situation was under control when the helitack crew arrived and no action was taken by the crew, and 11 fires where the crew took some kind of direct suppression action. The crew's efforts on these 11 fires were judged as effective in helping to reduce fire damage in 9 cases, ineffective in 1 case, and not needed in 1 case (the ground crews could have readily handled the fire). On at least two occasions the early arrival of the crew is credited with preventing the fast spreading fires from becoming campaign fires. Usually the men worked in conjunction with other suppression forces, but on at least one occasion they were able to extinguish a fire completely before the arrival of other crews.

The crew was located where, historically, travel time for field crews has been long, fire occurrence has been high, and the percentage of fires growing to classes C, D, and E has been well above the State's average. While fire occurrence in the crew's zone of initial attack was below normal in 1960, the general effectiveness of the crew was well demonstrated in reaching fires quickly and helping to reduce total acreage burned as well as total damages. Present plans are to activate the crew again in 1961.

D. Fire Economics

The Fire Economics Study, contracted by the Division to the School of Forestry, University of California, reached a crossroads during 1960. The objective of the study has been to provide clues which would enable the Division to achieve a level of fire protection effort so that the sum of protection expenditures plus fire damage would be at the lowest possible level. To reach this objective it has been necessary to conduct research in 1) the means of appraising the kind and magnitude of economic values protected by the Division and 2) the development of estimates of the probable effects on these values of alternative levels of fire protection effort.

The complex pattern of land values in California and the tremendous variation in the fire potential within the state have resulted in major difficulties for both lines of research.

The values at stake include all types of timber stands, young and old, pine and fir, etc.; aesthetic and recreational values; improvements in the wildland areas; forage and watershed values; and the direct threat to human life. Even the theory of appraisal is inadequate in many of these fields, while actual appraisal practice is known to be inadequate in others. To date the research has been concentrated on an economic analysis to define the values involved and to review actual damage appraisal practices. Reports are currently being prepared on this phase of the program.

The next step in research on values will be to study the possibility of developing practical procedures which will more adequately reflect these values. This will be difficult and perhaps not feasible in some cases. The costs of improving appraisal procedures must be weighed carefully against benefits to be derived.

The historical approach of gathering data of actual suppression efforts and relating the magnitude of these efforts to fire damage did not bear good fruit. Due to the inadequacies of the data and the high variability within the observation units, the statistical analysis (making use of multiple regression and high speed computing machines) yielded only negative results. No valid conclusions could be drawn from the equations derived.

Work on this phase of the project has shifted to the possibility of using the techniques of operations research. The approach being developed by the School of Forestry will involve intensive analysis of individual fires in an attempt to develop mathematical expressions of the effects of various measurable factors. Such techniques are currently being used in research on similar problems in military strategy and tactics.

Other exploratory work is being done in relating hazard reduction to the possible lowering of total suppression-plus-damage costs.

E. Fire Weather

1) Fire Danger Ratings

The operation of the California Fire Danger Rating System continued during 1960 with very few changes. There are still some problem areas related to record keeping that require continual training and checking. Southern California was given considerable attention through the medium of an extended field trip for the purpose of inspecting weather stations, converting wind counters to a new wiring scheme and to discuss the Burning Index with the field personnel. In addition, considerable time was devoted to the Los Angeles County cooperative stations with the aim of improving their methods of weather data recording and coding for the punch card system.

The 1959 weather records were carefully checked and corrected as necessary. These records have been delivered to the Pacific Southwest Forest and Range Experiment Station where the necessary punch card work will be performed. In February of 1961 it is expected that all CDF and Federal weather records for 1959 will be run through a UNIVAC 1180 computer. The computer programs are designed to produce many variations of breakdown of the Burning Index and weather factors as well as data on new types of Indexes. In 1959 approximately 29,000 days of weather record in CDF and contract county stations were accumulated.

Several new Indexes have been developed by the Pacific Southwest Forest and Range Experiment Station. Unfortunately, they were produced a little too late in the season to allow CDF to do much in the operational line with them. Some office work was done on simple analyses using the new Indexes for specific problems. It is proposed that 1961 will see full scale implementation and use of the new Indexes in cooperation with Federal stations. There are four new Indexes in addition to the Burning Index, which, in itself, is made up of a Spread Index (Spread Factor) and Intensity Index (Intensity Factor).

a) The Ignition Index:

The Ignition Index represents the joining of temperature and the relative moisture content of Fine Fuels to provide an Index number which indicates the chance of a given ignition source starting a fire. Based on a scale of 100 points, this Index is most applicable to the normal or smaller ignition sources rather than intense or mass fire causes, such as airplane crashes or vehicle and structural fires.

b) The Fire Load Index

Here we have the joining of the weather effects on various fuels through the medium of the Burning Index with the Ignition Index to summarize the effects of weather on ignitability, rate of spread and intensity of burning. To quote a recent Experiment Station report: "This summary characteristic of the Fire Load Index is then an expression of the potential fire prevention and suppression job necessary to meet the threat caused by weather."

c) Seasonal Severity Index

A method of treatment of the Fire Load Index, this index provides a means of comparison of the current season with any other season and with a long-term normal by fire danger rating area. Seasonal Severity is simply the accumulation daily of the Fire Load Index. It is best pictured through the medium of a graph.

d) Ratio to Normal Fire Load Index

Another method of treatment of the Fire Load Index, this number involves use of long term normals by ten day periods or decades. The total of observed Fire Load Index for ten days is divided by the normal for the same decade. This results in a direct ratio with 1.00 considered as normal. The index is easily graphed but may also be compared on the strictly numerical basis.

Computation of the new indexes for past years records to establish long term normals is being done by punch card and electronic machines.

2) Fire Weather Forecasting

Close liaison has been maintained with the U. S. Weather Bureau fire weather forecasters. Some modifications of the terminology of the forecasts were arranged in certain instances to better fit local needs and to assist in Index predictions. Forecasters were invited to participate in divisional training sessions. Whenever possible the forecaster has been encouraged to go beyond his formal forecast and offer general explanations of the present weather patterns.

This type of weather information dissemination has been undertaken with a great degree of success from the Redding Fire Weather office for some years.

To assist CDF personnel in understanding the general aspects of weather, a preliminary draft of a handbook titled "Weather Terminology" was prepared. Designed to tie broadscale weather patterns into general effects on fire weather, this booklet is profusely illustrated and represents contributions and corrections by all the fire weather forecasters in California. As time allows, a corrected and simplified edition of this booklet will be prepared. The forecasters have been asked for more detailed contributions concerning weather effects in their own forecast districts.

During 1960 discussion was made with other agencies concerning the goal of strengthening the Fire Weather services in California. In the latter part of the year definite unified proposals were made through the channels of the U. S. Forest Service to the Washington office of the Weather Bureau for additional forecast centers, forecasters and equipment for California. It is hoped that the forecasting plan for California will allow breakdown of current forecast districts into smaller areas allowing the forecaster to give

more attention to localized weather conditions which are so vital to the Fire Danger Rating system.

3) Fire Weather Instruments

Efforts continued to completely equip all CDF weather stations with wind counters. The counters are battery operated tally registers which record total wind movement over $2\frac{1}{2}$ hour periods. From the total count and the total elapsed time, an average afternoon wind velocity is determined and used in the Burning Index computations. The revised 12 volt system is now being used. Forty of these counters were constructed and will be in use in the summer of 1961.

Earlier models of counters now in field use used the 6 volt wiring system. Field work is being carried on to convert these older style counters to the 12 volt system.

One problem in measurement of Fire Danger Rating has been a satisfactory means of measuring the moisture content of fine fuels. Relative humidity, temperature or fuel moisture alone do not satisfactorily reflect the rapid changes that may occur in the fine fuels. A new commercially produced instrument called the "Xerometer" seems quite promising as a rapid response measuring device for fine fuel moisture. This instrument utilizes a specially prepared and treated natural fine fuel moisture sensing element. Response to moisture change is very fast. Further evaluation and testing of this instrument will be carried out in connection with the Pacific Southwest Forest and Range Experiment Station.

4) Radar and Thunderstorms

In early 1960 the U. S. Weather Bureau completed installation of a model WSR-57 10 centimeter radar set in Sacramento. Designed

specially for observation of precipitation, this set has a maximum range of 250 nautical miles. It incorporates both azimuthal scanning (Plot Plan Indicating) and vertical scanning (Range Height Indicating) as well as an echo analyzing scope for detail study of echos. Under normal conditions the effective operating range of the instrument is nearer 200 miles. Ranging is to the nearest tenth of a mile and azimuths can be determined with good accuracy to $\frac{1}{2}$ degree. The RHI scope provides elevation data on cloud tops and bases.

The Weather Bureau cooperated wholeheartedly with CDF in developing a pilot program utilizing the radar to detect and track suspected thunderstorms during the summer of 1960. Convective precipitation cells associated with thunderstorms are rather easily detected by the radar. By providing CDF with azimuth and range to such cells, we were able to convert these readings to a geographical position. This data was relayed to field units immediately along with information on the echo intensity and diameter, the apparent cloud top height and the direction and speed of movement. In return the field attempted to supply visual observations of the suspected thunderstorm such as presence or absence of lightning, occurrence of rainfall and the general character of the cloud.

Much information of a helpful nature was gained from this operation. The appearance of cells on the radar scope and the first evidence of direction of movement allowed an alert to be passed to the field that activity was starting. As situations developed, further warnings could be issued to areas ahead of the apparent advancing edge of regions of thunderstorm activity. In several cases one to three hour warnings were proven out. The termination of activity becomes quite apparent on the scope allowing an advisory

to be issued that given areas were clear of thunderstorm cells. Twenty four hour operation of the radar provides a lookout during the night and early morning hours for sudden outbreaks of activity.

It appears that there are several broad types of thunderstorm situations. Each one appears with a different pattern of development in the radar plots and usually have somewhat different echo parameters. Classification of these different patterns may aid materially in forecasting just what is going to happen in the way of lightning activity and the probability of lightning fires.

5) Fire Climate

The Division continued to contract funds to the Pacific Southwest Forest and Range Experiment Station for cooperative fire climate studies. The objectives of this program are to study fire behavior and to determine the effects on fire behavior of meteorological and associated fuel factors in and around a fire.

The principles learned from the several local surveys that have been made and reported in past years are now beginning to be applied to large fires. Fire behavior specialists from the Experiment Station interpret Weather Bureau forecasts in terms of fire behavior on specific parts of the fire line. These interpretations have been of considerable help to fire bosses and to sector bosses in planning and executing successful fire control actions. A few Division of Forestry personnel are beginning to work with these fire behavior specialists to learn their techniques. It will not be a short-term process.

The local wind survey in the De Luz Canyon of San Diego County was an extremely important step forward in understanding "unusual" fire weather and in being able to predict this weather. While the

data has not been completely analyzed, a few key points derived from the study permitted Division of Forestry personnel to be alerted and prepared for early afternoon down-canyon winds on at least one fire in the De Luz area during 1960. It is anticipated that further study of the data should show how the survey can be extended to the broad coastal area of southern California with a minimum of additional data collecting.

Similar surveys have been conducted in the Arroyo Seco Canyon and the Mt. Baldy area in Los Angeles County, with analysis of the data not yet complete. Another survey was started in 1960 in the Six Rivers National Forest to help determine when slash-burning in the Douglas fir type can take place most safely and effectively in clear-cut blocks. This survey should also help explain certain wind patterns in the coastal mountains of northwestern California.

F. Cloud Nucleation for Lightning Fire Prevention

Due to negative results with its program of cloud-seeding with ground generators in 1957-59, the Division deferred its cloud treatment operations in 1960.

To continue its objective of finding techniques for preventing lightning-caused fires, the Division in 1960 conducted a study designed to answer the questions: "Where do thunderclouds tend to build up in the Sierra Nevadas?" and "Where do the clouds tend to go?". Much of this study was made in cooperation with the U. S. Weather Bureau in Sacramento, using its giant weather radar, and with the U. S. Forest Service - Region 5 (specifically personnel on the Plumas and Tahoe National Forests). Results have not yet been evaluated, but operational phases of the program did demonstrate the potential ability of the radar to detect thunderstorm build-ups, to note their movement,

and to predict their future positions. In this way, the Division and the U. S. Forest Service several times were alerted to predictions of local thunderstorm activity, allowing them to prepare more quickly and more adequately for proper control measures.

G. Fuel Break

The objective of this program has been to break up vast expanses of continuous brush into smaller, more manageable units for ease of fire control effort. The Division has contracted funds to the Pacific Southwest Forest and Range Experiment Station for this program which is also supported by the U. S. Forest Service - Region 5, the Los Angeles County Fire Department, and the University of California at Davis. In addition to direct monetary support the Division has also contributed considerable additional efforts through its use of manpower and equipment in various fuel break action programs in southern California and, to a much lesser extent, in other parts of California.

Basic research by the Experiment Station includes mostly long-term studies concerned with green fuel moisture content in the native plants of southern California; whether or not other less flammable plants might be adaptable to southern California conditions, site classification relative to adaptable plants and various types of land treatment, and long term management of plant cover. A few tentative results of portions of these programs were reported in 1960, including the results of drilling grasses, the survival of various grasses planted in typical sites in southern California, a report on *Cistus* as a potential low-flammability plant, and green fuel moisture contents of chamise and sage measured in 1959.

Action programs include the establishment of fuel breaks. Comparisons have been made in the cost and effectiveness of different methods of removing brush, of killing sprouts from previously removed brush, and of establishing new cover types. Several chemicals for brush killing were tested in 1960. Also several plants are being tried as new cover types. The Experiment Station issued several reports in 1960 describing these projects, many of which were actively supported or directly accomplished by the Division's personnel.

3. IMPORTANT CHANGES IN PROTECTION PLANS,
ADDITION OF PERMANENT PERSONNEL, ETC.

A. 1956 Fire Plan Revision:

Five initial attack bulldozer-transport units were added during 1960. A total of 144 man months of Forestry Equipment Operator was added giving the Division 12 yearlong operators. A bulldozer-transport unit was added in District II in 1959 without the man months to hire operators. Now, all initial attack units have two men assigned on a yearlong basis.

B. Training:

Regular in-service training of both permanent and seasonal personnel of the Division to improve total operational efficiency continued throughout the year requiring 249,000 student hours and 32,000 instructor hours. Trained seasonal fire control personnel utilized 135,500 hours of the student total and 19,000 hours of instructor time.

Approximately three-fourths (85,000 hours of student time) of the training given permanent employees was designed to improve their knowledge and skills in fire control operations. The remaining effort was directed toward general administration, clerical, technical, artisan and orientation training. Assistant Rangers and Foremen

carried the bulk of the instructor work load acting for some 25,600 hours as instructors.

Some additional progress toward the standardization of seasonal employee training was made by establishing a standard minimum Fire-fighter training course, however, in actual practice with over 400 Foremen and over 150 Assistant Rangers acting as instructors in this course it is understandable that there was considerable variation in emphasis and in instructional methods. Training of seasonal personnel is complicated because of staggered work week schedules, irregular initial employment dates, turnover in seasonal classes and wide geographic distribution of employees at over 230 different locations.

The Division's two Training Centers located at Ramona, San Diego County, and Sutter Hill, Amador County, provided approximately 48 per cent of the total hours of in-service training given permanent personnel of the Division. During 1960 each Center trained 100 Forest Fire Truck Drivers and 20 Foremen. The course for both classes was five weeks long and provided approximately 232 hours of classroom and field instruction plus an additional 40 hours of supervised self-study. The two Training Centers are currently capable of providing slightly less than 50 per cent of the Division's needs for this type of in-service training.

Capital outlay plans and site studies were continued during 1960 to establish a permanent Training Center in Northern California. This same work will be continued in 1961 in an effort to establish a permanent Center of adequate capacity in Southern California. The staffs of both Training Centers were bolstered in 1960 with the addition of one full-time cook and one food service assistant at each Center.

Three employees of the Division continued to participate in the Pilot Study correspondence course in Supervision offered as in-service training for State employees by the Training Division of the State Personnel Board. This course consists of fourteen lessons originally scheduled for completion in twenty-eight weeks. Experience to date indicates that completion of this course will require approximately fifty-six weeks.

The Division continued to actively participate in Specialized Training programs offered through the University, State Colleges, Junior Colleges, and Industry schools for the improvement of professional personnel in their specialty areas.

C. Conservation Camps

The Conservation Camp Program in 1960 continued the rapid expansion of the previous year. Buses were provided for crew transportation and mobile camps introduced a new concept in the camp program.

Three new permanent 80 man camps were opened - Pilot Rock in southwestern San Bernardino County, Plum Creek in eastern Tehama County, and Mountain Home in eastern Tulare County. The new Mountain Home camp replaces a former operation which provided a 30 man seasonal camp for project work on the Mountain Home State Forest.

The establishment of three "Mobile Camps," each housing 40 inmates in special built trailers provides a unique change in the camp program. The "Mobiles" do make facilities available to work on conservation projects in isolated or other areas where climate or the over-all work program does not justify the installation of a permanent camp.

The addition of these five camps brought to 30 the number of conservation camps operated by the Division of Forestry jointly with the Departments of Corrections and Youth Authority (W/CDC 19 permanent,

3 mobiles, 1 seasonal with 1 summer and 1 winter location and, W/CYA 3 permanent and 3 spike camps). At the end of the year 1730 inmates and 265 wards, a total of 2005 men, were assigned to camps, an increase of 146 over the previous year. (Some of the temporary increases in population of 1959 were reduced in 1960 because of minor problems associated with overcrowding).

Twenty-four buses, a special build for operation in rough terrain, were purchased and assigned to camps throughout the State to provide more adequate transportation for some of the Conservation Camp Crews. It is anticipated that many of the stakeside trucks, long used for transporting camp crews, will be replaced by similar buses.

Four additional camps were under construction at the end of the year. Alder in Del Norte County and Don Lugo in San Bernardino County are scheduled for activation early in 1961, Washington Ridge in Nevada County and Intermountain in Lassen County should be in operation by midsummer. A site has been acquired for the Deadwood Camp to be built in Siskiyou County near the town of Fort Jones.

Three camps were expanded from 60 inmate to 80 inmate capacity by addition to barracks buildings and to dining rooms at Iron Mine Conservation Camp, Miramonte Conservation Camp, and Morena Conservation Camp.

D. Personnel Changes

Sacramento Administration:

In the Fire Control section one Meteorologist II has been added to coordinate relations between the U. S. Weather Bureau and the Division and to conduct research into the weather elements as they influence fire control operations.

An additional Forestry Equipment Engineer was provided to cover

increased workload pertaining to acquisition of Automotive Equipment for the Conservation Camp program.

The Fire Prevention Section has been provided with a Forest Fire Prevention Officer to assist the Law Enforcement Coordinator with the preparation of both civil and criminal cases relating to liability for man-caused fires.

A Lead Groundsman was added to the staff at Davis Nursery to provide better supervision for the day-to-day nursery operations and a full time clerical position was also added.

District Headquarters:

One Forest Firefighter Foreman to serve as relief dispatcher was added. Both the northern and southern Training Centers were provided with one Cook and one Food Service Assistant to relieve the training staff and the trainers of food preparation duties.

One State Forest Ranger I and five clerks were added to the Conservation Camp program to take care of increased workload resulting from expansion of camp facilities.

New Conservation Camps required the addition of eight new Forestry Superintendent positions, two Assistant Forestry Superintendents, forty-five Forestry Work Project Foremen and seven Forestry Equipment Operators.

Another twelve Forestry Equipment Operators were added to the Division's permanent staff for initial attack force and winter work crew augmentation.

The Division fire suppression strength for the 1960-61 fiscal year compared to the 1959-60 fiscal year is as follows:

<u>Class</u>	<u>Yearlong Employees</u>	
	<u>1959-60</u>	<u>1960-61</u>
Forest Firefighter Foreman:		
Crew Foreman	345	345
Patrol Foreman	35	35
Relief Dispatcher-Warehouseman (Ranger Units)	16	16
Relief Dispatcher (Dist. I; Dist. VI)	-	2
Forest Fire Truck Driver:	247 (73 County Contract dur- ing winter)	247 (72 County Contract dur- ing winter)
Forestry Equipment Operators		
Initial Attack Bulldozer Operators	98	110
Assigned to Conservation Camp	22	29

For comparative purposes with other states, the Division of
Forestry top (after four years of service) pay grades now are:

DIVISION OF FORESTRY PERSONNEL
Authorized Strength
(All Functions)

<u>Number</u>	<u>Civil Service Title</u>	<u>Monthly Salary</u>
1	State Forester	\$ 1,338
1	Chief Deputy State Forester	1,213
11	Deputy State Forester	1,048
13	Assistant Deputy State Forester	905
10	State Forest Ranger III	905
10	State Forest Ranger II	821
36	State Forest Ranger I	745
51	Associate State Forest Ranger	710
174	Assistant State Forest Ranger	644
12	Forestry Trainee (3-step range)	530
1	Meteorologist II	782
7	Senior Forest Technician	821
24	Forest Technician	745
19	Assistant Forest Technician	644
1	Law Enforcement Coordinator	905
2	Supervisor of Conservation Education	782
7	Forest Fire Prevention Officer	745
2	Associate Civil Engineer	862
21	Assistant Civil Engineer	745
1	Associate Equipment Engineer	862
3	Forestry Equipment Engineer	821
31	Forestry Superintendent, Conservation Camp	710
27	Assistant Forestry Superintendent, Conservation Camp	644
238	Forestry Work Project Foreman	613
14	Forest Fire Dispatcher	556

Authorized Strength
(All Functions)
(Cont'd.)

<u>Number</u>	<u>Civil Service Title</u>	<u>Monthly Salary</u>
398	Forest Firefighter Foreman (398 yearlong)	\$ 556
297	Forest Fire Truck Driver (247 yearlong) (4-step range)	481
139	Forestry Equipment Operator (139 yearlong) (3-step range)	556
1161	Forest Firefighter (seasonal only)	376
124	Forest Fire Lookout (seasonal only)	395
208	Camp Crew Cook (30 yearlong)	415

4. FIRE EQUIPMENT AND IMPROVEMENTS:

A. Equipment

1. Inventory:

During 1960 the Division had in operation the following equipment: (**)

<u>Transportation</u>		<u>Fire-Fighting Equipment</u>		<u>Construction and Maintenance Equipment</u>	
Sedans	142	Pumpers:		Maintainers (Graders)	25
Station Wagons	26	Firetrucks FWD	155	Dump Trucks	39
Panels	16	Firetrucks Conv.	257	Cement Mixers	43
Pickups	191	Pickup Pumpers	42	Compressor Trucks	2
Stakesides	184	Bulldozers:		Compressor Trailers	34
Jeeps	61	Large	50	End Loaders	15
Suburbans	41	Medium	39	Miscellaneous	40
Buses	44	Transports:		Semi-Trailers	30
		Large	29		
		Medium	30	3 Mobile Units consisting	
		Misc. Equipment:		of 15 Trailers each.	
		Wheel Tractors	4	Each Unit has 2 House-	
		Discs	12	trailers.	
		Small Tractors	2		
		W/plow	1		
		House Trailers	19		
		Various	11		
		Special Service	46		
		Miscellaneous	32		
		Semi-Tank Trlrs.	21		

** Up to July 1, 1961 - end of present Fiscal Year.

During 1960 (60-61 F.Y.) the following vehicles were received and placed in service:

		Camp Expansion*	
18	Sedans*	Sedans	2
23	Pickups*	Pickups	2
11	Stakesides*	Stakesides	4
16	Firetrucks FWD	Tractors	2
13	Firetrucks Conv.	Transports	1
6	Tractors*	Woodchippers	3
11	Transports*	Dump Trucks	2
3	Panels	Cement Mixers	2
7	Pickup Pumpers	Air Compressors	2
16	Sta. Wagons, Sub.*	End Loaders	2
3	Dump Trucks*	Graders	3
2	Concrete Mixers*	B.D. Service Units	4
	Graders*	Buses	14
2	Compressors*		
6	B.D. Service Units*		
2	End Loaders*		
20	Buses*		

2. Equipment Development:

As no funds were appropriated for equipment development in the 1959-60 F. Y. budget, no monies were available for this purpose until July 1, 1960. Some work continued on projects already started with few new projects initiated at the date of this report.

Heat Resistant, Personnel Protection Blanket:

During 1959 and 1960 blankets were made of various types of heat and flame resistant cloth, and subjected to a number of heat, flame, and wear resistant tests. A final destruction test at near maximum forest fuel temperatures and flame, indicated an aluminized blanket of slightly heavier cloth than presently available, could be expected to provide a reasonable degree of protection for personnel trapped in a fire. Under the most severe conditions it appears as if a human could survive for not less than four minutes. Given the advantage of a few feet of clearance, the time would be greatly extended. Such a cloth is now commercially available. A sufficient amount of material has been purchased to make eighteen blankets which will be placed on initial attack bulldozers for further study since this seems to

be our greatest area of exposure.

Forest Fire Hydraulics Slide Rule:

Increased use of water for fire control through longer and more complex hose lays, higher lifts and relay pumping, has resulted in an added interest in basic hydraulics, and the need for a pocket slide rule on this subject which can be easily read by the man in the field. Such a slide rule has already been developed for municipal type apparatus; however, the factors are not generally applicable to Forestry's use of smaller hose and nozzles. Adopting the same type of design we have developed a rule to cover our needs which can be made by any specialty manufacturer for approximately seventy-five cents each in lots of 1,000. An initial order will be processed in the near future to be distributed during training courses on the subject.

Abrasive Resistant Fire Retardent Transfer Pump:

The use of sodium-calcium-borate and bentonite clay as fire retardents for aircraft application has resulted in the adoption of many types of pumps to transfer the abrasive slurry materials from storage tanks. While a number of pumps are acceptable for this purpose we have found they are generally rather expensive for the low pressure - high volume requirement. Our Davis Shop have designed and are fabricating an inexpensive pump of sheet metal utilizing a pressured lantern ring design to eliminate expensive seal design. We hope to have the pilot model tested and a sufficient number built for airport distribution before fire season.

Fire Retardent Batch Type Mixer:

Although a continuous feed ejector type fire retardent mixer appears to be the most efficient, three years of experience now indicate the problems of accurately metering dry powders into a metered water orifice cannot be delegated to crews having little or no experience. The problems

become more complex as the ratio of fire retardant/water becomes less. Since the logistics of handling great quantities of materials does not lend itself to an emergency operation, the trend, if any, will be toward a more concentrated material requiring greater accuracy in metering. We believe a batch type mixer lends itself toward our operations; therefore, we have designed and built a pilot model agitator type batch mixer requiring little experience to produce a satisfactory product. Additional mixers will be produced as rapidly as funds and time will permit.

B. IMPROVEMENTS

1. Structures

There were six major construction projects completed during the 1960 year, three mobile trailer camps completed, and the renovation of a leased conservation camp; each of these consisted of a number of separate buildings or trailers. In addition, there were twenty-seven separate building projects.

a. Complete Conservation Camps for the following:

- (1) Pilot Rock Conservation Camp, San Bernardino County
- (2) Plum Creek Conservation Camp, Tehama County
- (3) Mountain Home Conservation Camp, Tulare County

With the following building complements:

- (1) 80 man barracks with recreation room
- (2) Two combination staff office and barracks buildings
- (3) 100 man kitchen and messhall combination
- (4) 11 stall equipment storage buildings
- (5) combination shop and warehouse
- (6) gas and oil house
- (7) Dynamite storage vault
- (8) 2 residences with garages (Pilot Rock and Mountain Home only)

Plus site development including water and sanitation systems.

b. Three complete Mobile Conservation Camps located in:

- (1) District I - North Coast
- (2) District II - Sierra-Cascade
- (3) District IV - San Joaquin

With the following trailer components:

- (1) Office Trailer
- (2) Staff Dormitory trailer
- (3) Three inmate dormitory trailers
- (4) One combination inmate dormitory and storage trailer
- (5) Kitchen trailer
- (6) Messhall trailer
- (7) Dry stores and refrigerator trailer
- (8) Recreation trailer
- (9) Toilet and shower trailer
- (10) Generator trailer
- (11) Shop and warehouse
- (12) Water trailer
- (13) Liquid petroleum gas trailer
- (14) Two residence trailers
- (15) Gasoline trailer
- (16) Diesel trailer (for generators)

Plus recurring site development including all utility services.

c. 90 man Conservation Camp acquired and completely renovated.

- (1) Murietta Conservation Camp (Los Gatos Canyon) Fresno County

d. Ranger Unit Headquarters - replacement of office building and barracks building

- (1) Riverside Ranger Unit Headquarters - Perris

e. Nursery Headquarters replacement

- (1) Davis Nursery Headquarters: Combination office, packing, planting, shop, materials storage and equipment storage building, lath house, and green house.

f. Forest Fire Stations: Two new facilities at Buckhorn, Shasta County and Sunol, Alameda County.

- (1) 13 man barracks at Buckhorn
- (2) Combination 13 man barracks and messhall building and two stall plus storage equipment building at Sunol

g. Office Buildings - Addition

- (1) Fresno Ranger Unit Headquarters - Sanger, Fresno County
- (2) San Luis Obispo Ranger Unit Headquarters, San Luis Obispo County
- (3) Morena Conservation Camp (CDC Office Building), San Diego County
- (4) Oak Glen Conservation Camp (CDC Office Building), Riverside County

h. Barracks Buildings - Addition

- (1) Siskiyou Ranger Unit Headquarters - Yreka
- (2) Humboldt Ranger Unit Headquarters - Fortuna
- (3) Iron Mine Conservation Camp - Placer County
- (4) Miramonte Conservation Camp - Fresno County
- (5) Morena Conservation Camp - San Diego County

i. Messhall - Addition

- (1) Iron Mine Conservation Camp - Placer County
- (2) Miramonte Conservation Camp - Fresno County
- (3) Morena Conservation Camp - San Diego County

j. Combination Barracks and Messhall

- (1) Woodlands Forest Fire Station - Mendocino County

k. Recreation Building - Expansion

- (1) Parlin Fork - Mendocino County

l. Equipment Building - Addition

- (1) Ukiah - Mendocino County

m. Bulldozer Transport Storage Building - Added

- (1) Bieber Forest Fire Station - Lassen County

n. Auto Shop and Bulldozer Transport Storage Building

- (1) Tehama Ranger Unit Headquarters - Red Bluff, Tehama County

o. Auto Shop

- (1) Butte Ranger Unit Headquarters - Oroville, Butte County

p. Laundry Building

- (1) Iron Mine Conservation Camp - Placer County
- (2) Rainbow Conservation Camp - San Diego County
- (3) Minnewawa Conservation Camp - San Diego County

q. Residence and Garage

- (1) Ahwahnee Forest Fire Station - Madera County

r. Lookout Cab Modification (sliding glass panels and catwalk)

- (1) Bloomer Mountain Lookout - Butte County
- (2) Bear Mountain Lookout - Fresno County

s. 4-Pole Antenna Structure

- (1) Banner Mountain - Nevada County

2. Water and Sanitation Development

- (1) Dobbins Forest Fire Station - Yuba County, water system remodel
- (2) Smith Creek Forest Fire Station - Santa Clara County, well
- (3) Pacheco Forest Fire Station - Santa Clara County, well
- (4) Oak Glen Conservation Camp - Riverside County, spring and pipeline
- (5) Ramona Forest Fire Station - San Diego County, pipeline
- (6) Santa Margarita Forest Fire Station - San Luis Obispo County, well
- (7) De Luz Forest Fire Station - San Diego County, well
- (8) Ahwahnee Forest Fire Station - Madera County, well
- (9) Shady Creek Forest Fire Station - Nevada County, dug well
- (10) Alder Conservation Camp - Del Norte County, well and pipeline
- (11) Groveland Forest Fire Station - Tuolumne County, well
- (12) Washington Ridge Youth Conservation Camp - Nevada County, well
- (13) Sonoma Ranger Unit Headquarters - Santa Rosa, Sonoma County, deepened well
- (14) Campo Forest Fire Station - San Diego County, New well
- (15) Plum Creek Conservation Camp - Tehama County, residence well
- (16) Trabuco Forest Fire Station - Orange County, dug well

3. Bridges

The current inventory of bridges by class of construction and by District is as follows:

DISTRICT	I		II		III		IV		V		VI		TOTAL	
	Lin.		Lin.		Lin.		Lin.		Lin.		Lin.		Lin.	
Class	No.	Ft.	No.	Ft.	No.	Ft.	No.	Ft.	No.	Ft.	No.	Ft.	No.	Ft.
A (Suspension)	0	0	0	0	1	270	0	0	0	0	0	0	1	270
B (Steel Beam)	1	38	7	471	4	182	0	0	0	0	0	0	12	691
C (Timber Span)	7	212	9	191	0	0	2	40	2	90	1	16	21	549
D (Conc. Slab)	1	39	0	0	7	88	0	0	0	0	0	0	8	127
E (Log Span)	4	111	4	131	1	15	0	0	0	0	0	0	9	257
F (Steel Truss)	0	0	7	788	5	881	0	0	1	70	0	0	13	1739

District II Fawn Lodge Bridge #5F1 changed from 30 ft. Class E to 60 ft. Class F

District III Boards Crossing Bridge #30F5 former U.S.F.S. added to CDF system
160 Class F

District IV Horse Creek Bridge #46F1 no longer on fire road network now in
Terminus Reservoir recreational area deduct 26 ft. Class C

4. Maintenance and Improvements

Division of Forestry personnel, frequently with the aid of conservation camp inmates, accomplish a wide variety of tasks which can be included in this general category: Minor remodeling of existing structures as well as painting, re-roofing, etc., site development and landscaping, normal road and telephone line maintenance including improvements

where needed and of major consequence are the many, many miles of new firebreaks which have been completed within the last year throughout the Division's area of fire protection responsibility.

5. Telephone Lines:

<u>DISTRICT</u>	<u>PHONE LINES (Grd.)</u>	<u>PHONE LINES (Metallic)</u>
I	165	116
II	214.2	414
III	0	580
IV	16	221.25
V	75	163
VI	0	62.3
	<u>470.2</u>	<u>1,556.55</u>
Total Miles		2,026.75

6. Roads:

The increase of 764.9 miles of this report over last years does not reflect the addition of new roads but a more accurate inventory of the roads that we maintain as of December 31, 1960.

The 141.5 miles of low standard roads shown for District I may be subject to some revision as to standard classification when conditions permit a field review of existing standards not shown by our office records.

<u>DISTRICT</u>	<u>ROAD (Miles)</u>
I	321.00
II	1115.20
III	461.00
IV	513.10
V	481.90
VI	<u>616.20</u>
Total Miles, state-wide	3,508.40

7. Power Lines:

13 Miles

8. Land Transactions:

Title acquired to 4 parcels of land involving the following facilities:

1. Armstrong Forest Fire Station
2. Petaluma Forest Fire Station
3. Plum Creek Conservation Camp - Transfer and Control of land for pipe line and water
4. Davis nursery exchange

Lease transactions as follows:

1. Deer Creek Mobile Camp site
2. Konocti Mobile Camp Site
3. Konocti Mobile Camp Residence site for two trailers
4. Garberville Air Attack base
5. Norton Sky Ranch Air Attack base
6. Ryan Air Attack base (6-month)
7. Paul Hoberg Air Attack base
8. Loma Rica Air Attack base
9. Heliports - 2 parcels of land from San Bernardino County
10. District V Headquarters antenna space
11. District V Headquarters additional office space
12. Ben Lomond lease amended to include pipe line
13. Bakers Ford lease for patrolman
14. Mustang Forest Fire Station extension for 1 year
15. Cayucos Forest Fire Station - lease for summer months of 1960
16. Dulzura Forest Fire Station - lease for summer months of 1960
17. Irvine Lake Forest Fire Station
18. Alder Conservation Camp - easements
19. Round Top Lookout from East Bay Municipal Utility District
20. Pratt Mountain - 25 year lease
21. Minnewawa Conservation Camp - 2 year lease extension
22. Miramonte Conservation camp lease (30 years)

Use Permits:

1. Strawberry Peak use permit amendment
2. Mountain Home Conservation Camp Residence Site, garage and water tank-sites through amendments to original use permits

9. Maps:

The Calaveras Ranger Unit map was printed during the year and sent to the field. The new district maps were also printed and are used in every district. These maps show the new zone boundaries as approved by the Board of Forestry on October 23, 1958.

During the year considerable time was used in preparing the maps and charts for the publication issued by the Outdoor Recreation Committee. Numerous charts and maps were also prepared for all sections within the Division.

C. Radio:

The statewide fire net has been completed to the extent that there is now a direct microwave tie between the Sacramento administrative office and each of the six district offices *. Equipment is now on order, commencing the program of tying the district offices with their respective ranger unit offices. Equipment now on order will accomplish this in seven cases. Seven mobile relays have the capability at the present time to inter-connect into this microwave circuit with the equipment for an additional nine now on order. This allows for statewide communication with vehicles. Thirteen remote air net base stations are either installed or on order, operating on a separate microwave circuit, which will allow for statewide control of aircraft.

The program of frequency change that has been in progress for the last three years is now 85 per cent completed with equipment requested in the 1961-62 Fiscal Year budget, this program should be completed.

The following chart shows the number of units that will be operating in the 1961 fire season by various types.

* District III tie will be installed early in 1961.

	<u>On Hand or Order</u>
Mobile Units	1270
Portables - Fire Camp	33
Handie Talkies	555
Aerial Radios (Aircraft use)	82
Base Stations - Forest Fire Stations	185
Base Stations - Ranger Unit & District Hdqtrs.	37
Base Stations - Conservation Camps	32
Base Stations - Lookouts	71
Mobile Relays - Fixed	63
Mobile Relays - Portable	10
Microwave Terminals	42
Total	<u>2380</u>

5. FIRE PREVENTION

Forest Fire prevention in California is approached through integrated mass media education, law enforcement, hazard reduction, and public relations programs. Each phase of the endeavor is influenced by efforts exerted in each of the other phases. This portion of this report will illustrate the wide range of activities credited to the Division of Forestry with emphasis on educational efforts. However, the California program is one of cooperation involving many other public and private organizations, making it almost impossible to segregate the activities of one from the rest. Therefore, many of the contributions credited below will have been those of the Division only in part.

Through the California Fire Prevention Committee, the State Forester and Regional Forester of the Forest Service coordinate a State-wide mass media education program. This Committee has a membership of over four hundred of the State's leaders from industry, business, labor, utilities, transportation, indoor advertising, informational services, organizations, agriculture, military, and other governmental agencies and individuals. As members of this Committee and working cooperatively with protection agencies are the Redwood Region Conservation Council and Keep California Green, Inc. These privately supported organizations have extensive forest fire prevention programs directed by full-time executives, supplementing the programs of public agencies. The Conservation Council of Southern California has an organized and planned forest fire prevention section. The San Francisco Chamber of Commerce has a "Keep Green" Committee dealing directly with forest fire prevention. There are several county agencies that direct planned programs which are coordinated with the State-wide campaign.

Because the program involves so many people and organizations other than Division of Forestry personnel, this report will be divided into two parts; Part I will deal with Division of Forestry field personnel activities and Part II will treat the State-wide Cooperative Mass Media Education Program.

1. Division of Forestry Field Personnel Activities:

The statistics which follow are offered to indicate the concerted effort directed toward the prevention of forest fires and to show the scope of these activities by field personnel. These activities are in addition to those listed under part two of this report.

A. Newspaper Publicity

1. Made 9,909 contacts with the press which resulted in editorials, fire news, and other prevention copy.
2. Made 1,849 news releases.
3. Made 82 contacts with press which resulted in 70 drop ins and 12 sponsored advertisements.

B. Radio Publicity

1. Participated in 433 radio presentations (talks, interviews, and programs).
2. Presented material for 2,089 short announcements.

C. Visual Education

1. Distributed 2,450,000 pieces of printed material, including posters, leaflets, pamphlets, stickers, etc.
2. Arranged for 1,096 displays in store windows, theaters, and public buildings.
3. Made 1,425 postings on Division of Forestry 4' x 8' highway right-of-way roadside signs.
4. Displayed 72 floats and/or equipment which were viewed by 287,000 people.
5. Made 61 exhibits at fairs which were viewed by 1,500,000.

D. Group Contacts

1. Presented 1,248 programs with and without films which were attended by 47,000 adults.

2. Presented 1,709 programs with and without films attended by 116,000 children.

E. Training

1. Held 3,340 training programs with an attendance of 21,900.

F. Personal Contacts

1. Made 268,000 personal contacts at fair booths and equipment exhibits.
2. Made 194,000 contacts during normal work day.
3. Made 67,000 personal contacts during 46,750 man hours spent on patrol duty.

G. Permits

1. Issued 116,283 regular burning permits.
2. Issued 624 range improvement permits.

H. Inspections (Zones I and II)

1. Sawmills - 685
2. Other mills - 143
3. Logging Operation areas - 2,039
4. Industrial areas (other) - 752
5. Dumps (public and private) - 1,233
6. Public areas (recreational, school, etc.) - 1,908
7. Residential areas (farm and mountain) - 14,364
8. Mechanical equipment (farm, logging, construction, etc.) - 4,541

I. Hazard Reduction (Zones I and II)

Rights-of-way

1. State and county highways (disced, burned, or treated) - 483 miles.
2. State and county highways (disced, burned, or treated in co-operation with others) - 357
3. State and county highways (disced, burned, or treated by others) - 1,125
4. Railroads fireproofed (cooperative) - 269 miles.

The following statistical record lists, by per cent of total of man-caused fires, locations, causal agents, and causes of forest fires occurring in the Division of Forestry's direct protection responsibility area (Zones I and II):

<u>Location</u>	<u>%</u>
Roadside	34.78
Logging and Lumbering Areas	2.53
Wildlands	39.08
Dooryards	10.44
Cultivated Areas	3.66
Railroads	5.82
Dumps	1.89
Miscellaneous	1.80
	<hr/>
	100.00

<u>Causal Agents</u>	
Rancher-Farmer	9.40
Tenant	9.16
Children	13.94
Traveler	25.38
Commercial Transporter	1.05
Forest Product Worker	2.49
Construction Worker	1.45
Hunter	7.55
Fisherman	1.44
Recreationist	4.13
Tramp	1.32
Railroad & Other Vehicles	9.24
Miscellaneous	13.25
Structural Agents	.20
	<hr/>
	100.00

<u>Causes</u>	
Smoker-Matches-Tobacco	42.17
Debris Burning (non-permit)	3.61
Debris Burning - Permit Escape (Land Clearing, incinerators, range improvement, trash burning)	10.65
Vehicle	9.72
Railroad - Mechanical	3.90
Incendiary	13.62
Logging Slash	.48
Sawmill Burner	.52
Power Line	2.29
Campfires	2.61
Blasting, spontaneous combustion, stationary engine, welding, structural	1.84
Miscellaneous	8.59
	<hr/>
	100.00

2. State-wide Cooperative Mass Media Education Programs

These programs in California are directed primarily toward urban, suburban, out-of state visitors and other transient users of wildland areas. However, a considerable amount of time and effort of field personnel carry the same type of program to local people, especially those in smaller cities and towns.

As mentioned above, the State Forester and the Regional Forester coordinate mass media efforts through the California Fire Prevention Committee. Over a period of years, staff personnel have been assigned to work with active and potential cooperators on a program directed toward acquainting them with their individual and organizational responsibility for the prevention of forest fires. The goal is to realize maximum use of all available facilities in an educational program. In assuming responsibility, it is not unusual for the cooperator to produce and distribute materials attendant to mass media programs. There is no possibility that these can be enumerated, but included are posters, leaflets, direct mail stuffers, features in press, house organs, training publications and other printed organs. Motion picture features for television, outdoor advertising space, drop-in ads, window displays, fair exhibits, merchandise displays, and many other media were utilized. Air time on radio and television, trailers in motion picture theaters, public address facilities on trains and aircraft, displays in public transportation equipment, displays on car and truck bumpers, signs on truck bodies, and others too numerous to mention here were put to work as a public service. Libraries and schools, youth groups, civic organizations, farm associations, water and soil districts, lumbering interests, and other organizations adopted forest fire prevention as an objective in public service.

In addition to activities of Division personnel listed in Part I, cooperative fair exhibits were prepared at the Los Angeles County Fair, California State Fair, and at large association meetings in metropolitan areas which an estimated one million people viewed.

To service the many cooperators, the Division prepared and produced or purchased in an excess of nine million pieces of material.

The Division continued with production of motion picture films for distribution to television stations, motion picture theaters, and other public showings.

Suggested radio spot announcements and other materials were provided to all radio stations.

Two or more spots were supplied each week for over a seven-months' period.

Portable fair exhibits were provided for use by field personnel and cooperators, eleven are now available for this use.

Information

Dissemination of information has long been considered an important function of the California Division of Forestry. Increased emphasis has been put on this phase of the organization's operations with the establishment of a position to coordinate informational activities and public services.

During the past year the greatest accomplishment was in official recognition by all administrative levels of the agency for the desirability of performing their assigned roles in an atmosphere of acceptance and understanding made possible by well-informed employees and an adequately informed public.

Information on wise use of wildland resources, recent developments in reforestation and afforestation, legal and conservation aspects of timber harvesting, technical problems in range management, with problems and

developments in fire control has been more widely disseminated than in the past.

While the Southern California District has long used the services of a fireline public information officer, this classification was first assigned to large fires in other parts of the State during the past year. Specifications are now being drawn up for fireline Public Information Officer. In the future at least one person with this classification will be assigned to every major conflagration on State-protected areas.

Each function in the Division is being encouraged to recognize the news and educational values of its activities and to publicize those that will encourage better wildland protection and management.

6. LAW ENFORCEMENT

Activities in the field of law enforcement expanded considerably in 1960. Increased emphasis was continually placed on various aspects of civil law enforcement, as exemplified in the fire suppression cost recovery program. The fields of criminal and administrative procedures law enforcement were equally stressed.

During the Spring of 1960, the various administrative districts, assisted by the Sacramento Headquarter's Law Enforcement staff, conducted training sessions to all personnel involved in the Division's law enforcement function. This training, for the most part, was on the subject of the Uniform System of Law Enforcement Procedures as they are applicable to the civil suppression cost recovery program.

A Division-wide training program to standardize and effectuate the physical and operational features of criminal, civil, and administrative law enforcement is in the planning stage and is expected to be introduced to the field forces in 1961.

A new position of Fire Prevention Officer, with the duties of Assistant Law Enforcement Coordinator, was budgeted and the position filled in 1960.

The following statistical report indicates action taken by the Division in law enforcement. These actions resulted after investigation of circumstances concerning each fire. No attempt has been made here to segregate actions as to zones, therefore, this report covers Zones I, II and III:

CRIMINAL

Total investigations for violations	12,168
Criminal cases initiated	289
Complaints filed	248
Convictions	216
Fines levied	\$12,947
Fines paid	\$ 5,761
Prison or jail sentences	4,106 days
Prison or jail suspended	1,460 days
Juveniles involved	72
Reparations ordered by court	\$10,905
Administrative cases through District Attorneys	27

CIVIL

Cases investigated for liability	2,485
Cases submitted for review or disposition	684
Amount involved in pending actions	\$199,000
Awarded by courts in 1960	\$ 13,660
Collected in 1960 on previously pending cases	\$ 30,600

7. INCREASES IN APPROPRIATIONS

<u>1959-60 Expenditures</u>	<u>Estimated 1959-60</u>	<u>Actual 1959-60</u>	<u>Change</u>
Support	\$ 18,120,129	\$ 17,484,159	- \$ 635,970
Other Current Expenditures	<u>3,637,293</u>	<u>3,570,479</u>	- 66,814
Total	\$ 21,757,422	\$ 21,054,638	- \$ 702,784
Capital Outlay	\$ 6,000,633	\$ 3,738,826	- \$ 2,261,807
<u>1960-61</u>	<u>Actual 1959-60</u>	<u>Estimated 1960-61</u>	<u>Change</u>
Support	\$ 17,484,159	\$ 18,836,624	+ \$ 1,352,465
Other Current Expenditures	<u>3,570,479</u>	<u>3,480,045</u>	- 90,434
Total	\$ 21,054,638	\$ 22,316,669	+ \$ 1,262,031
Capital Outlay	\$ 3,738,826	\$ 5,708,477	+ \$ 1,969,651

Support

1959-60

Actual Salaries and Wages were \$347,352 less than the estimated amount, with savings distributed among all the functions. The overall savings was 3 per cent, and due in the most part to inability to fill vacant Engineering positions and to the light spring fire season.

Actual Operating Expenses were less than estimated by \$123,728. Savings were effected in all functions other than Administration. This function reflects the Division's cost for radio maintenance and the payment made in lieu of property taxes on State Forest Lands, both of which were appreciably more than budgeted funds. The overall percentage of savings was 2 per cent.

Actual Equipment Expenditures were \$36,109 less than budgeted funds, or a 3 per cent savings effected in all functions except field services.

Reimbursements were \$89,967 greater than anticipated. Appreciable increases were shown in the amounts received from the Bureau of Land Management for protection of forested and nonforested public domain lands, and for conservation work performed for the Division of Beaches and Parks.

1960-61

Estimated Salaries and Wages exceed the actual amount spent in 1959-60 by \$1,525,569 or an increase of 11 per cent. A general salary increase was granted by the Legislature, effective July 1, 1960.

Estimated Operating Expenses are \$703,359 less than the amount actually spent in this category the previous year. Reductions in all functions were necessary in order to effect the 2.2 per cent savings directed by the Department of Finance, and savings were also realized as a result of a reduction in the inmate labor rate paid to the Department of Corrections. The overall decrease was 14 per cent.

Estimated Equipment expenses are \$45,888 greater than the previous year's actual expenses, or an increase of 3 per cent. The major increase is in the Field Services function.

Reimbursements are expected to decrease by \$84,544 which is mainly due to the fact that the budget reflects net cost to State for radio equipment being purchased for which Federal matching funds will be received. The reimbursement was not established in the budgeting process.

Total estimated increase for Support in 1960-61 over 1959-60 is \$1,352,465.

Other Current Expenses

1959-60

Actual expenditures were \$66,814 less than anticipated for Other Current Expenses. Savings in Emergency Fire Suppression and the Forest and Fire Research Program were the main factors in this reduction.

1960-61

Other Current Expenses estimated for 1960-61 are \$90,434 less than actual expenditures for the previous year. The reduction can be attributed to anticipated decrease in Emergency Fire Suppression expenditures, and the application of the 2.2 per cent savings as directed by the Department of Finance.

Capital Outlay and Savings

The increase in estimated expenditures for 1960-61 is generally due to the Division's expanding Conservation Camp Program.

8. LEGISLATION

No new legislation was enacted in 1960 which pertained to the fire control operations of the Division of Forestry.

9. PROGRESS MADE IN MEETING FIRE PROTECTION STANDARDS AND OBJECTIVES

Steadily, if not spectacularly, steps in the progress of meeting high fire protection standards and objectives are being taken by the Division in discharging its obligation to Clarke-McNary, as well as all other primary responsibility lands in California. By any statistical technique of measurement the answer is the same; slow sure progress toward containment of most fires before extensive damage has been done; measurable prevention of potential forest fires before starting; education of the public in its responsibilities to the protection of its natural resources.

Considering the average size of all fires on the 19.8 million acres of Clarke-McNary lands under protection in California as a criterion of progress in containment of wildfires, it is demonstrable that during the thirteen year period from 1948 to 1960 inclusive, this average dropped from a computed 65.6 acres in the first year to 52.4 acres in the final year of the period; or a yearly average of 1.1 acres per fire.

Concerning prevention: while it is true that during the same period (1948-1960 inclusive) there was no measureable decline in the number of man caused fires from the thirteen year average of 1970 fires, it is equally true that, in relation to the increase in population during that period, there was a gratifying computed decrease in the number of man-caused fires per 100,000 population from 20.30 in 1948 to 12.1 in 1960, or a yearly average per 100,000 capita decrease of about .68 fires. This is a four per cent annual average decline from the thirteen year per 100,000 capita average of 16.20 man caused fires on Clarke-McNary lands.

In light of the above noted statistical facts, the greatly condensed table below indicated the influence of 1960 accomplishment upon the overall effort:

California Clarke-McNary Lands

<u>Total Fires</u>	<u>Acres Burned</u>	<u>Acres per Fire</u>	<u>Annual Average % of C.M. Lands Burned</u>
<u>1951-55 Average</u>			
2,228	137,623	62	.70
<u>1955-59 Average</u>			
2,424	119,275	49	.60
<u>1960</u>			
2,373	121,512	51	.61

10. COOPERATIVE AGREEMENTS FOR PROTECTION OF STATE AND PRIVATE LANDS

1. Clarke-McNary Land Protection

The State Forester contracts, by cooperative agreements, for the protection of Clarke-McNary lands with the U. S. Forest Service and the six contract counties of Kern, Los Angeles, Marin, San Mateo, Santa Barbara, and Ventura, as follows:

C-M Lands Protected by the State	13,399,000
C-M Lands Protected by the U.S. Forest Service	4,792,436
C-M Lands Protected by the Contract Counties	<u>1,618,555</u>
Total	19,809,991

2. Federal Lands Protected by the State

<u>Agency</u>	<u>Area-Acres</u>	<u>Method of Payment to State</u>
Bureau of Land Management		
Unappropriated Public Domain:		
Zone I	1,813,423	24¢/acre/year
Zone II	507,056	24¢/acre/year
Other	330,000	None
Grazing District Lands, Zones I, II and III	690,000	Fire Cost Reimbursement
U. S. Forest Service	386,523	

Federal Lands Protected by the State (Cont)

<u>Agency</u>	<u>Area-Acres</u>	<u>Method of Payment to State</u>
Bureau of Indian Affairs	266,230	Fire Cost Reimbursement
Other Government	<u>225,000</u>	None
Total	4,218,232	

3. Total Land Area Directly Protected by the State

- * Zone I and II 29,520,566 Acres
- ** Zone III (24 Counties) 6,078,118 Acres
- * All State, private and intermingled federal lands, which are directly protected by the State and are primary watershed or timber lands with contiguous secondary watershed and grazing lands. (13,399,000 acres are Clarke-McNary)
- ** Rural, agricultural, grazing and wildlands not qualifying as State responsibility but which are protected by the State on an actual presuppression cost basis reimbursed by the County concerned. Each county buys the protection desired.

11. NUMBER OF FOREST FIRE FATALITIES

No fire line fatalities occurred on fires in the direct protection area of the Division during 1960.

12. NATURE AND EXTENT OF MILITARY COOPERATION

1. In Zone I, on 10 fires, 3,850 man hours were expended.
2. In zone II, on 6 fires, 257 man hours were expended.
3. In Zone III, on 7 fires, 46 man hours were expended.
4. On 5 non-forest fires, 55 man hours were expended.

Federal Lands Enclosed by the State of Texas
Amount of Land
to State
Amount of Indian Affairs
to State

State Government
Amount of Land
to State
Amount of Indian Affairs
to State

1. Total Land Area Directly Enclosed by the State
to State I and II
to State III (if Contained) - 5,012,118 Acres

2. All other private and unenclosed lands, which are
directly enclosed by the State and are privately owned or
under lands with no other person's interest and grazing
land, 5,012,118 Acres
3. All other private and unenclosed lands, which are
not directly enclosed by the State but which are protected by the State or are
under lands with no other person's interest and grazing
land, 5,012,118 Acres

11. NUMBER OF HOURS OF PROTECTION
No other facilities covered by the direct protection
area of the Division during 1960, and no other facilities

12. NATURE AND EXTENT OF MILITARY COOPERATION
1. In Zone I, 10 hours, 1,000 man hours were expended.
2. In Zone II, 10 hours, 1,000 man hours were expended.
3. In Zone III, 10 hours, 1,000 man hours were expended.
4. In Zone IV, 10 hours, 1,000 man hours were expended.

13. SUMMARY OF RESULTS
1. In Zone I, 10 hours, 1,000 man hours were expended.
2. In Zone II, 10 hours, 1,000 man hours were expended.
3. In Zone III, 10 hours, 1,000 man hours were expended.
4. In Zone IV, 10 hours, 1,000 man hours were expended.

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